

CLAIMS:

1. A polypeptide monomer capable of oligomerisation, said monomer comprising a polypeptide sequence which potentiates protein folding inserted into the sequence of a subunit of an oligomerisable protein scaffold.
2. A polypeptide monomer according to claim 1, wherein the oligomerisable protein scaffold subunit is selected from the group consisting of bacteriophage T4 Gp31, Escherichia coli GroES and homologues thereof of the cpn10 family.
3. A polypeptide monomer according to claim 1, wherein the polypeptide sequence is inserted into the sequence of the oligomerisable protein scaffold subunit such that both the N and C termini of the polypeptide monomer are formed by the sequence of the oligomerisable protein scaffold subunit.
4. A polypeptide monomer according to claim 1, wherein the polypeptide sequence is inserted into the oligomerisable protein scaffold subunit by replacing one or more amino acids thereof.
5. A polypeptide monomer according to claim 4, wherein the oligomerisable protein scaffold subunit is bacteriophage T4 Gp31 and the polypeptide sequence is inserted into the oligomerisable protein scaffold subunit by substantially replacing the mobile loop between amino acid positions 27 and 42.
6. A polypeptide monomer according to claim 4, wherein the oligomerisable protein scaffold subunit is Escherichia coli GroES and the polypeptide sequence is inserted into the oligomerisable protein scaffold subunit by substantially replacing the mobile loop between amino acid positions 19 and 29.
7. A polypeptide monomer according to claim 4, wherein the oligomerisable protein scaffold subunit is bacteriophage T4 Gp31 and the polypeptide sequence is inserted between positions 59 and 61 of the oligomerisable protein scaffold subunit.

8. A polypeptide monomer according to claim 4, wherein the oligomerisable protein scaffold subunit is Escherichia coli GroES and the polypeptide sequence is inserted between positions 56 and 57 of the oligomerisable protein scaffold subunit.

9. A polypeptide monomer according to claim 4, wherein the oligomerisable protein scaffold subunit is bacteriophage T4 Gp31 and polypeptide sequences are inserted between positions 27 and 42 and between 59 and 61.

10. A polypeptide monomer according to claim 4, wherein the oligomerisable protein scaffold subunit is Escherichia coli GroES and polypeptide sequences are inserted between positions 19 and 29 and 56 and 57.

11. A polypeptide monomer according to claim 2, wherein the polypeptide sequence is displayed at the N or C terminus of the oligomerisable protein scaffold subunit.

12. A polypeptide oligomer comprising two or more polypeptide monomers according to claim 1.

13. A polypeptide oligomer according to claim 12, which is a homooligomer.

14. A polypeptide oligomer according to claim 12, which is a heterooligomer.

15. A polypeptide oligomer according to claim 14, wherein complementary protein folding are juxtaposed through the oligomerisation of different polypeptide monomers.

16. A polypeptide oligomer according to claim 12, wherein the monomers are covalently crosslinked.

17. A polypeptide oligomer according to claim 12, wherein the protein scaffold is in the form of a ring.

18. A polypeptide oligomer according to claim 17, wherein the ring is a heptameric ring.

19. A polypeptide monomer or oligomer according to claim 1, wherein the polypeptide sequence is selected from the group consisting of a minichaperone, a protease prosequence and a foldase.
20. A polypeptide oligomer or monomer according to claim 19, wherein the foldase is selected from the group consisting of a thiol/disulphide oxidoreductase and a peptidyl prolyl isomerase.
21. A method for promoting the folding of a polypeptide comprising contacting the polypeptide with a polypeptide oligomer or monomer according to claim 19.
22. A method according to claim 21, wherein the polypeptide is an unfolded or misfolded polypeptide.
23. A method according to claim 21, wherein the polypeptide comprises a disulphide.
24. A method according to claim 21, wherein the foldase is selected from the group consisting of thiol/disulphide oxidoreductases and peptidyl-prolyl isomerases.
25. A method according to claim 24, wherein the thiol/disulphide oxidoreductase is selected from the group consisting of E. coli DsbA and mammalian PDI, or a derivative thereof.
26. A method according to claim 24, wherein the peptidyl prolyl isomerase is selected from the group consisting of cyclophilin, parbulen, SurA and FK506 binding proteins.
27. A method according to claim 21, comprising a polypeptide sequence with a polypeptide oligomer comprising a polypeptide monomer or two or more polypeptide monomers and a non-oligomerised foldase, said monomer or monomers comprising a polypeptide sequence which potentiates protein folding inserted into the sequence of a subunit of an oligomerisable protein scaffold.

28. A method according to claim 21, wherein the polypeptide oligomer, said oligomer comprising a polypeptide monomer or two or more polypeptide monomers, said monomer or monomers comprising a polypeptide sequence which potentiates protein folding inserted into the sequence of a subunit of an oligomerisable protein scaffold, and/or the foldase is immobilised onto a solid phase support.

29. A method according to claim 28 wherein the solid phase support is agarose.

30. A solid phase support having immobilised thereon a polypeptide oligomer according to claim 12 and/or a foldase.

31. A column packed at least in part with a solid phase support according to claim 30.

32. A method of promoting the folding of a polypeptide comprising utilizing a polypeptide according to claim 12, optionally in combination with a foldase.

33. The method according to claim 32 wherein the polypeptide and/or the foldase is immobilised on a solid phase support, wherein the polypeptide comprises a monomer or two or more polypeptide monomers, said monomer or monomers comprising a polypeptide sequence which potentiates protein folding inserted into the sequence of a subunit of an oligomerisable protein scaffold.

34. A composition comprising a combination of a polypeptide oligomer according to claim 12 and a foldase.